The Royal College of Surgeons of England

GENERAL

Ann R Coll Surg Engl 2007; **89**: 354–358
doi 10.1308/003588407X183436

Impact of HIV and AIDS on surgical practice

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ABSTRACT

INTRODUCTION Surgical intervention has become a common component in the management of patients infected with the human immunodeficiency virus (HIV) or suffering from the clinical consequences of acquired immunodeficiency syndrome (AIDS). We investigated the evolution of this involvement at a tertiary referral centre for this condition over a 16-year period.

PATIENTS AND METHODS Detailed retrospective examination of the medical records of HIV-positive patients treated at the Royal Free Hospital between 1986 and 2002 was undertaken. Clinical, pathological and operative details of those patients who underwent surgical intervention were recorded.

RESULTS Of the 2100 cases reviewed, 477 patients underwent a combined total of 772 surgical procedures. Of the 772 operations, 95 (12.3%) were performed as emergencies. Anorectal surgery represented the highest group with a total of 195 procedures (25.26%) being undertaken. The majority of patients (59%) had AIDS at the time of surgery, and 27.04% had a significant co-existing medical problem. Overall postoperative complication rate was 10.1%, with the risk being significantly greater in those undergoing intra-abdominal surgery and emergency procedures.

CONCLUSIONS This is the largest study to audit the impact of HIV/AIDS in general surgical practice in the UK retrospectively. Surgery for HIV patients can be safely conducted with a low complication rate for the diagnostic and anorectal procedures that comprise the vast majority of surgery in HIV/AIDS patients. Medical treatment for patients with HIV/AIDS has developed dramatically over the last two decades. In parallel, this has resulted in a heavy, new and varied workload for general surgeons, who have also had to adapt in order to deal with the challenging spectrum of this disease.

KEYWORDS
HIV – AIDS – Surgery – Audit

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Over 40 million people world-wide, including 50,000 in the UK, are believed to be living with HIV or AIDS (Health Protection Agency 2004). Currently, the prevalence of HIV is rising progressively each year. This is attributable both to the increasing number of new diagnoses and improved efficacy of advancing medical therapy. Surgical involvement in the care of HIV-positive patients has grown, with procedures ranging from diagnostic to palliative. The Royal Free Hospital has one of the largest HIV populations in London, with a total patient number of 2800. At this institution, management of HIV-positive patients has become a part of routine surgical practice. Surgical treatment of patients infected with HIV is necessary for problems both related and unrelated to HIV infection. As the prevalence of HIV continues to rise in this country, it is anticipated that there will be a corresponding increase in surgical workload. The purpose of this study was to explore the nature and frequency of surgical procedures performed in the Royal Free Hospital HIV population to assess the impact of HIV and AIDS on surgical practice.

Patients and Methods

The present report is a retrospective analysis of 477 patients with HIV or AIDS who underwent surgery at the Royal Free Hospital, London between 1986 and 2002. This cohort of patients was identified following extensive review of the medical records of 2100 patients with an HIV or AIDS diagnosis, which was recorded in the medical records prior to surgery. HIV status had previously been ascertained by enzyme-linked immunosorbant assay (ELISA) for HIV antibody and subsequently confirmed by Western blot. Patients were classified as having asymptomatic or symptomatic HIV infection or AIDS, in accordance with the Centers for Disease Control Revised Classification system for HIV infection (1993).[1] Evidence of surgical intervention

was obtained by examination of the original operation note in all cases. Examination of in-patient, out-patient and nursing records revealed evidence of postoperative complications.

In the group of patients who underwent surgery, basic demographic characteristics of gender, date of birth, year of diagnosis, risk factor for HIV infection and the presence of co-morbid disease was recorded. Recent CD4 counts (recorded within the 3 months prior to each surgical intervention) were also recorded. The type of anaesthetic employed was noted and whether the operation was performed under elective or emergency conditions.

In each case, surgical indications, proceedings and outcome were recorded and pathological findings were noted. For patients who have died since surgery, date and cause of death data were obtained from the Department of HIV Medicine. Cause of death was categorised as follows: end-stage HIV, opportunistic infection, AIDS-related malignancy or other causes.

Results

Demographic information

The cohort of 477 patients underwent a total number of 772 operations during the study period (1986-2002); of these, 351 patients were male, 129 were female. The predominant risk factor for men was homosexual intercourse (n = 267) and heterosexual intercourse for women (n = 101). Intravenous drug use accounted for 43 cases, with 11 cases of transfusion-related infection, six needle-stick injuries and one case of vertically transmitted HIV.

Co-morbidity

Of the 477 subjects, 129 reported co-morbidity at the time of first operation – 95 patients reported single co-morbidity, 34 reported two or more diseases in addition to HIV infection. Infectious disease was the most common co-morbidity (n = 59) comprising hepatitis B infection alone (n = 20), hepatitis C infection alone (n = 25), hepatitis B and C co-infection (n = 7) and syphilis (n = 7). Hepatitis C infection was acquired predominantly by intravenous drug abuse (n = 22) and, in two cases, it was transmitted by blood transfusion. Of the 20 patients with hepatitis B infection alone, most (n = 15) were male homosexuals.

Indications for surgery

The majority of operations were indicated either to diagnose lesions suspected of yielding HIV or AIDS-related pathology (41.1%) or with an intention to treat known diseases resulting from HIV pathology (49.37%). The remaining 9.5% of surgery was unrelated to the diagnosis of HIV. The majority of surgical procedures were undertaken for patients with clinically advanced disease as 60.2% had a diagnosis of AIDS. Commensurate with clinical stage, the majority of surgical procedures were performed on patients with immunologically advanced disease with CD4 counts of below 200 (48.7%). Fewer operations were undertaken in clinically asymptomatic patients with CD4 counts over 600 (11.9%).

Surgical categories

INTRA-ABDOMINAL SURGERY

General surgeons performed 42 intra-abdominal operations during the study period. Of the 13 elective laparotomies (Table 1), the following AIDS-defining pathology were diagnosed: two cases of ileocaecal tuberculosis, two small bowel high-grade B-cell lymphomas and one case of extensive small bowel Kaposi's sarcoma with internal fistula formation and ulceration. A para-aortic lymph node biopsy revealed disseminated intra-abdominal *Mycobacterium*

Table 1 Breakdown of elective intra-abdominal operations

Elective laparotomies	Diagnosis of intra-abdominal space occupying lesions (8)	Ileocaecal TB (2) Small bowel lymphoma (2) Small bowel Kaposi's sarcoma (1) Disseminated intra-abdominal TB (1) Gastric lymphoma (1) Rectosigmoid Kaposi's sarcoma (1)
	Splenectomy (2)	HIV-related thrombocytopenia (2)
	Choledochojejunostomy (1)	Bile duct stricture (1)
	Open cholecystectomy (1)	Gallstones (1)
Others	Repair of midline incisional hernia (1)	
	Laparoscopic cholecystectomy(2)	Gallstones (2)

Table 2 **Breakdown of emergency intra-abdominal operations**

Emergency	Indication	Outcome
Emergency laparotomy (9)	Peritonitis/acute abdomen/sepsis (7)	Jejunal perforation (1)
		Spontaneous bacterial perforation (2)
		CMV oesophagitis (1)
		Fournier's gangrene (1)
		Infarcted ovary and GI bleed (1)
		Pelvic inflammatory disease (1)
	Small bowel obstruction (2)	High-grade B-cell lymphoma (1)
		Cold stricture following prior small bowel resection (1)
Appendicectomy (7)	Appendicitis (7)	Typical suppurative appendicitis

avium intracellulare, an AIDS-defining diagnosis. A laparotomy performed to identify and resect a massive lesion arising from the stomach and invading the hepatic parenchyma again revealed an unresectable high-grade B-cell lymphoma. Two defunctioning colostomies were performed, one for a patient with extensive Fournier's gangrene and ischiorectal abscesses which had not resolved despite extensive and repeated debridement. The loop colostomy was reversed one year later at which point the perineal and peri-anal sepsis recurred. A massive, unresectable rectosigmoid Kaposi's sarcoma was also defunctioned via a palliative colostomy.

Additional elective procedures included a cholodochojejunostomy which was performed for a bile duct stricture and three cholocystectomies (one open, two laparoscopic) all conducted in young male subjects under the age of 25 years. Each of these subjects was on antiretroviral therapy, a recognised cause of cholelithiasis. In addition, two splenectomies were performed for HIV-related thrombocytopenia.

Nine emergency laparotomies were performed during the study period (Table 2). One case of small bowel perforation, a well-described surgical phenomenon in HIV, was identified with two cases of small bowel obstruction secondary to high-grade B-cell lymphoma.

In two subjects with peritonitis, no evidence of obvious perforation was found but, in each case, extensive purulent fluid was seen and a diagnosis of spontaneous bacterial peritonitis was made (pneumococcal in each case). One patient presenting with an acute abdomen underwent a negative laparotomy but, on subsequent gastroscopy, his symptoms were attributable to severe cytomegalovirus oesophagitis. In addition to AIDS-related pathology, we also observed seven cases of appendicitis. All seven patients made uneventful recoveries and histopathology in each case confirmed typical suppurative appendicitis.

In two cases, female patients presenting with peritonism were found at laparotomy to have gynaecological pathology. One was found to have extensive acute pelvic inflammatory disease; in the second case, a right hemicolectomy with right oophorectomy was performed for ovarian torsion with resultant necrosis and intra-abdominal haemorrhage. This patient went on to have two further laparotomies, involving packing of the abdominal cavity and re-examination 48 h later. The patient's condition deteriorated and she declined further intervention, dying from faecal peritonitis 3 weeks later.

ANORECTAL SURGERY

A total of 196 anorectal operations were performed during the study period (25.26% of all surgery performed during this time). The vast majority of anorectal surgery was performed on male homosexuals (n = 164). Thirty procedures were performed as emergencies, the rest elective. Clinical stage at operation was as follows: 113 AIDS patients, 53 symptomatic patients and 22 asymptomatic patients.

Histopathological data were available following 95% of all anorectal biopsies. Twenty-nine cases of anal intraepithelial neoplasia (AIN) were identified following biopsy, the majority of which were AIN III (n = 18) Additional pathology also included three squamous cell carcinomas, three rectal lymphomas and two rectal Kaposi's sarcomas.

DIAGNOSTIC BIOPSIES

A total of 94 diagnostic biopsies were performed with most procedures conducted on AIDS patients (n = 48). Of these, 76 were performed under general anaesthetic, the remainder under regional anaesthetic. The median CD4 count at operation was 263.

There were 54 lymph node biopsies performed during the study period and the following AIDS-defining illnesses were diagnosed as a result: Kaposi's sarcoma (n = 8), high-grade lymphoma (n = 24), tuberculosis (n = 5), and Castleman's disease (n = 1). Of the lymphomas, 16 were B-cell

lymphomas, five were T-cell lymphomas and two were Burkitt's lymphomas. Following excision of skin lesions, pathological diagnosis was made of one high-grade cutaneous B-cell lymphoma and one cutaneous Kaposi's sarcoma.

Complications

The overall complication rate was 10.1%, but a significantly higher risk of complication followed intra-abdominal procedures. In these cases, the septic sequelae (pelvic collections and wound infections) were the most common complications. A complication rate of less than 5% was achieved for anorectal surgery. In these cases, complications were all related to delayed healing of wounds. No complications were reported after diagnostic biopsies. A marginally higher complication rate was reported following surgery in patients with a diagnosis of AIDS but, in the main, the difference was insignificant across the clinical stages of the disease spectrum. However, when CD4 count was used as a discriminator, a considerably higher risk was identified in patients with a CD4 count below 200 when compared with patients with values over 600. In addition, 95 emergency procedures were carried out, mostly indicated for sepsis (59%) or haemorrhage (19%). There was a higher risk of complication in those undergoing emergency operations.

Discussion

Risk of transmission

This study is the largest retrospective study examining the impact of an HIV/AIDS diagnosis on surgical workload. In a department where operations are regularly performed on HIV patients, there were no reported needle-stick injuries to staff during this period from known HIV patients. Where possible, knife-less surgery is used on HIV patients, since the introduction of cutting diathermy and stapling devices. Universal precautions are strictly adhered to. Interestingly, Of the 2100 HIV patients at the Royal Free Hospital, 4 patients had acquired HIV through needle-stick transmission in their roles as nurses (3 cases) and doctor (1 case) at other hospitals.

Anorectal surgery

Anorectal surgery was the most common category of operation performed on HIV patients. In our population, the vast majority of the patients were male homosexuals presenting with extensive anal condylomata, fistula-in-ano, haemorrhoids and peri-anal abscess. The incidence of squamous cell carcinoma of the anus and anorectal Kaposi's sarcoma must also be borne in mind when conducting anorectal procedures, with adequate biopsy of suspicious lesions. It was found in our group, that anorectal procedures were safe procedures, with a low complication rate (5%) – almost entirely related to delayed wound healing in patients with low (< 200) CD4 counts. Given the excellent result achieved by the majority of surgery, this category of operation is both necessary and well-tolerated. Given the comparative frequency with which anorectal procedures are performed in our department, this is an important and clinically relevant finding.

Diagnostic biopsies

Generalised lymphadenopathy is a common symptom in HIV infection, and may be part of the clinical spectrum (progressive generalised lymphadenopathy) or indicative of an AIDS-defining illness. Open lymph node biopsy is being used more frequently in order to secure a histological diagnosis in HIV patients. Where lymphoma is suggested by fine needle aspiration, an open biopsy may obtain enough tissue to provide a histological classification. In a clinically suspicious FNA-negative node, an open biopsy will provide histological confirmation. Diagnostic biopsy is also important for the diagnosis of HIC-associated infections such as tuberculosis, *Mycobacterium avium* complex, and lymphadenitis. As a result of our study, an AIDS-defining illness was found in 78% of diagnostic biopsies, leading to the implementation of systemic antiretroviral treatments, demonstrating how important this type of surgery is in the care of HIV patients. No postoperative complications were recorded from this group, showing how safely these procedures can be performed.

Intra-abdominal surgery

HIV-infected patients may present with abdominal symptoms related to organomegaly and intraperitoneal and/or retroperitoneal lymphadenopathy caused by opportunistic infections and neoplasia. At the Royal Free Hospital, computed tomography (CT)-guided biopsy has largely replaced diagnostic exploratory laparotomy as the diagnostic procedure of choice because it permits diagnosis of *M. avium* complex infection, Kaposi's sarcoma, and lymphoma. Laparotomy is rarely necessary to evaluate organomegaly or lymphadenopathy and should generally be reserved for therapeutic procedures, such as drainage of pus, resection of neoplasm, and relief of obstruction.

In one retrospective study, it was reported that only 8% of HIV-infected patients presenting to accident and emergency with abdominal pain required abdominal surgery and HIV-associated pathology accounted for only 10% of diagnoses in patients with abdominal pain and advanced HIV disease.[2] In our own series of patients, 16 of 42 intra-abdominal operations were directly performed for HIV-associated diseases or the sequelae of antiretroviral therapy. The vast majority of patients had immunologically advanced disease at the time of laparotomy, which probably accounts for the high postoperative complication rate (25%). However, with the advent of minimally invasive surgery and interventional radiological techniques, the need for diagnostic laparotomies in this group should diminish.

Complications

With respect to complication rates, published data regarding the value of CD4 counts in predicting postoperative septic complications after surgery are controversial. In a retrospective study of 56 HIV-positive trauma patients in New York, the incidence of postoperative bacterial infection was independent of CD4 count.[5] However, further studies have reported that HIV seropositivity is an independent risk factor for the risk of developing complications after surgery in comparison to non-HIV-infected individuals.[4–6] Data from our study show that the incidence of complications was higher in patients with low CD4 counts (< 200). The higher incidence of complications following emergency operations is probably related to the high number of emergency operations that were performed for sepsis. One limitation of this study is that we reviewed the progress of patients who contracted HIV before the advent of highly active antiretroviral therapy (HAART) into wide-spread general use. It is now widely acknowledged that current therapeutic regimens decrease the risk for bacterial infections, improve nutritional status and increase life expectancy.[7] Further studies are needed to ascertain whether patients tolerate surgery even better in the HAART era.

Conclusions

Surgeons are integral in establishing diagnoses of HIV-related pathology that may be eminently treatable employing modern antiretroviral agents. Medical treatment for patients with HIV/AIDS has developed dramatically over the last two decades. In parallel, this has resulted in a heavy, new and varied workload for all surgical specialties, which have also had to evolve in order to deal with the challenging spectrum of this disease.

From this study it is evident that HIV/AIDS presents unusual and challenging acute surgical problems across all specialties and that surgeons play a vital synergistic role, working in conjunction with HIV physicians in the management of HIV positive patients.

Acknowledgements

This work has been presented, in part, at a meeting of The Association of Surgeons of Great Britain and Ireland, Harrogate, 2004 (abstract published in the *British Journal of Surgery*, May 2004) and at the XIII International Symposium for HIV and Emerging Infectious Diseases (Toulon, France, 2004).

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